



Emergency Handling of Frozen Foods

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IN HIS REPORT on Hurricane Carol, which swept through New England in September 1954, the Public Health Service regional medical director in that area observed: "An interesting phase of the recent disaster was that the primary public problem arose from the loss of electric service. With the loss of electric power, food freezing and storage equipment

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failed and large quantities of perishable food in wholesale lots had to be disposed of in such a manner that it would not be scavenged."

With the great expansion of the frozen food industry during the past decade, the emergency handling of frozen foods has become increasingly important. In this paper, we shall consider two major types of emergencies: those due to possible contamination of the food in the event of enemy attack with radiological, biological, or chemical weapons and those due to failure of the refrigerating mechanism, such as occurred in the wake of Hurricane Carol. Many questions concerning the problems posed by these emergencies remain to be answered, but a few guidelines have been developed for use in planning to meet them.

Protection From Contamination

Much has been written in recent months about the hazards of radioactive fallout following an enemy attack with atomic weapons. As far as is known now, the danger to frozen foods probably can be dismissed with the comment that such foods in unbroken packages should be safe. Frozen food in homes is not only packaged, but it is also kept in well-insulated and closed refrigerators or freezing units. Frozen food in commercial storage has the additional protection of well-constructed, heavily insulated, and tightly sealed buildings.

To verify the assumed safety of packaged food products, the Federal Civil Defense Administration sponsored a series of tests on the ability of such foodstuffs to withstand atomic blasts during the atom bomb testing program in Nevada. The tests were directed by the Food and Drug Administration in cooperation with the Department of Agriculture and private industry. One of the tests, conducted in the spring of 1955 with cooperation from the Association of Frozen Food Manufacturers, concerns frozen foods and frozen food containers, and FCDA is expected to publish the findings in the near future. It will be interesting to see whether packaged frozen foods under actual conditions of an atomic blast come up to the expected standards of safety.

Frozen foods in unbroken packages are also fairly well protected from contamination by biological or chemical agents. In the manual, "Defense Against CBR Attack," the Department of Defense has tabulated the effectiveness of various types of protective packaging (1). Sealed cans, according to the manual, afford complete protection against vapors, liquids, biological organisms, and radioactive dusts. Cellophane and metal foil packaging provide complete protection if all joints are tight and if the cellophane has been kept dry. Ordinary paper containers furnish only poor to good protection against these four types of contamination. These evaluations, however, are pertinent only to situations in which the food is protected by packaging alone, that is, where the food is outside a home freezer or where a contaminating agent has been introduced into a commercial freezer warehouse. As previously noted, the nature of the home freezing unit and

of the commercial warehouse normally assures that known contaminating agents will not penetrate as far as the individual food packages.

Preservation During Power Failure

Failure of electric power, which was the cause of a food handling emergency during Hurricane Carol, has occurred frequently as a result of natural disasters. In planning for an unexpected, prolonged period without electricity, consideration must be given to the preservation or the consumption of large quantities of frozen and refrigerated foods so that spoilage will be held to a minimum.

The first and most obvious question in regard to this type of emergency is: How long can frozen foods be kept either in a home freezer or in a refrigerated warehouse before they begin to spoil? The answer is elusive and variable and is dependent on several factors. Tests by the Department of Agriculture indicate, however, that frozen foods can be stored in a typical small home freezer without power for about 3 days (2). The National Association of Refrigerated Warehouses reports that an informal survey among its members drew responses of anywhere from 1 day to 2 weeks in answer to the question: How long will your warehouse store frozen food without power?

Among the many factors that determine the length of time frozen foods can be kept without spoiling during a power failure in either a home freezer or a commercial warehouse are these:

1. Type, quantity, and condition of the insulation of the freezer or warehouse.
2. Temperature within the freezer or warehouse at the time of power failure. The colder the food, the longer it will stay frozen.
3. Type of products stored. Frozen meats, for example, will absorb heat much more slowly than frozen baked foods.
4. How full the freezer or warehouse is at the time of power failure. Generally, a full freezer will hold frozen foods hours longer than an almost empty one. Thus, once the power has failed, frozen foods serve as a temporary refrigerant in delaying temperature rise. By the same reasoning, a large box will keep foods frozen longer than a small one.

5. Whether or not it becomes necessary to open a freezer or warehouse. This is the most important of all the factors influencing holding time. Once power has stopped, frozen food storage units should not be opened except to transfer the food elsewhere or to add dry ice.

When available, dry ice is the best deterrent to temperature rise, particularly in home freezers. In preparing a community to meet disasters which may entail power failure, officials should locate nearby dry ice manufacturing plants and arrange for large quantities to be delivered, by air if necessary, and distributed during the emergency. Despite the heavy loss of food in New England as a result of Hurricane Carol, considerable quantities of frozen foods which otherwise might have spoiled were preserved with dry ice flown in from communities not affected by the storm.

If dry ice is not available, ordinary ice may be used to prolong the storage life of frozen foods, but it should be used only when the foods show evidence of thawing. Ordinary ice should not be added until foods have begun to soften, since ice temperature usually is just below 32° F., whereas frozen foods normally are stored at about 0° F.

Admittedly, the time may arrive during a period of power failure when it is no longer possible to refrigerate frozen food. Dry ice or ordinary ice, even if available initially, may have been exhausted, and temperatures in home freezers and refrigerated warehouses may have risen so that the foods would spoil if not further preserved. It must be remembered that because of the rupture of cellular structure during freezing, foods that have been frozen deteriorate much more rapidly after thawing than do fresh foods.

Almost any method of preserving fresh food—canning, cooking, salting, smoking—can be used to preserve food that has been frozen. Corned beef may not enjoy as much popularity as a sizzling steak, but most housewives have salt on the pantry shelf and putting a choice cut of meat into a brine solution seems preferable to having to discard it after it has spoiled. Similarly, if heavy spoilage losses are to be avoided, operators of frozen food warehouses must be prepared to cook, or otherwise preserve,

thawing food, or to distribute it quickly to persons who can.

Civil Defense Planning

In communities near freezer warehouses, frozen foods may constitute an excellent emergency resource for use in mass feeding operations during a disaster. As pointed out earlier, frozen foods stored in warehouses which remain intact after an enemy attack probably would be safe from contamination. And, because of the imminent danger of food spoilage under assumed conditions of electric power failure, such foods would have to be consumed within a few days. Although some warehouses do have auxiliary diesel electric powerplants, the percentage of warehouses so equipped is relatively small. A proper activity for civil defense officials might be to convince warehouse operators of the advisability of equipping their refrigerated storage units with auxiliary power. From a dollars-and-cents viewpoint, a standby diesel generating unit would seem to be a matter of good business.

As an approach to eventual solution of the many problems involved in protection of foods in time of emergency, the National Research Council, at the request of the Food and Drug Administration, has appointed a committee of experts in food technology to study the subject. The stated purpose of this committee is: "To consider the present preparedness of the food processing and warehousing industry with respect to its vulnerability to overt or covert special weapons attack. If necessary, to recommend corrective measures, or research to develop corrective measures, which will reduce the vulnerability." The National Research Council has been asked to report on the following specific items:

"1. The points where food and the major food processing industries are most vulnerable to overt or covert attack with special weapons.

"2. Corrective measures, or research needed to develop corrective measures, which will reduce this vulnerability.

"3. The suitability of existing facilities and practices for sanitizing or decontaminating food plants, equipment and products in a civil defense emergency.

"4. Any further facilities or practices needed for sanitizing or decontaminating food plants, equipment and products in a civil defense emergency."

It is understood that the study committee's report, anticipated late this year, will include an evaluation of problems in handling frozen foods.

Guides to Preparedness

Despite the many unanswered questions, certain actions can be taken now by local officials in preparation for preservation and proper use of frozen foods during an emergency period:

1. Locate existing refrigerated warehouses and encourage operators to provide auxiliary power sources if they have not already done so. Such standby power could save not only the frozen food stored in the warehouse, but also individual homeowners' stocks, which could be transferred to the warehouse until power is restored in the area.

2. Encourage decentralization of new warehouses away from centers of likely target cities.

3. Locate dry ice manufacturing plants and plan for prompt distribution of dry ice to owners of home freezer units in event of power failure. This may include planning for importation of dry ice if it is not manufactured locally.

4. Educate the public on procedures to follow in the event of power failure. The individual

home owner should know that dry ice is, or is not, available—and where; that freezer units should be kept closed insofar as possible; and that frozen meats and other frozen foods can be preserved for later use only by cooking or otherwise preserving them as soon as they begin to thaw.

5. Prepare an estimate of the numbers and capacities of mobile freezer units, such as trucks and railway cars, that may be available. Some frozen food, particularly that stored in warehouses, might be saved by transfer to these vehicles.

6. To meet the eventuality that all possible sources of power may be destroyed, a plan should be prepared for rapid distribution of large stocks of frozen foods to minimize waste.

We all hope, of course, that the occasion for the use of emergency measures may never arise in our own communities. However, the annual number of natural disasters alone is ample indication of the immediate need for planning the preservation of the Nation's food supply during an emergency.

REFERENCES

- (1) U. S. Department of the Army: Defense against CBR attack. Field manual 21-40. Washington, D. C., U. S. Government Printing Office, 1954.
- (2) U. S. Department of Agriculture: What to do when your home freezer stops. Leaflet 321. Washington, D. C., U. S. Government Printing Office, 1952.

Departmental Announcement

Herold C. Hunt, Ed.D., Charles William Eliot professor of education at Harvard University, and former general superintendent of schools in Chicago, was appointed Under Secretary of Health, Education, and Welfare by President Eisenhower on Sept. 2, 1955. For more than 25 years, Dr. Hunt has held responsible



administrative positions in public schools, among them superintendencies at St. Johns, Mich.; Kalamazoo, Mich.; New Rochelle, N. Y.; and Kansas City, Mo. He has also lectured at summer sessions of several universities. He has held important positions on many professional education associations, serving as president of the American Association of School Administrators from 1947 to 1948, and as chairman of the American Council on Education in 1948-49.